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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
ANTON ESSER, ET AL. : EXAMINER: CORDRAY, D. R.  
SERIAL NO: 10/590,933 :  
FILED: AUGUST 28, 2006 : GROUP ART UNIT: 1741  
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FOR: METHOD FOR PRODUCING :  
PAPER, PAPERBOARD AND  
CARDBOARD

SECOND DECLARATION UNDER 37 C.F.R. § 1.132

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

I, Dr. Anton Esser, declare and state as follows:

1. I am the same Dr. Anton Esser who executed a Declaration dated December 9, 2009 (First Esser Declaration) in the above-identified application.
2. I am familiar with the claims, and have read the Decision of the Board of Patent Appeals and Interferences mailed December 2, 2011, in the above-identified application.
3. The following experiments were conducted under my supervision and/or control.
4. The following additional polymers, shown in **bold**, were evaluated. For ease of reference, corresponding data from the specification and the First Esser Declaration are included, except Comparative Examples 4, 5 and 6, which add the polymer to low-consistency stock.

PVAm 1:

Polyvinylamine polymer having a molecular mass of 400,000 D (prepared by hydrolysis of poly-N-vinylformamide, degree of hydrolysis 95 mol%)

PVAm 2:

Polymer of 30 mol% of vinylamine units and 70 mol% of N-vinylforamide units, having a molecular mass of 400,000 D (prepared by partial hydrolysis of poly-N-vinylformamide)

PVAm 3:

Polymer of 10 mol% of vinylamine units and 90 mol% of N-vinylforamide units, having a molecular mass of 2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)

PVAm 4:

Polymer of 1 mol% of vinylamine units and 99 mol% of N-vinylforamide units, having a molecular mass of 2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)

PVAm 5:

Polymer of 20 mol% of vinylamine units and 80 mol% of N-vinylforamide units, having a molecular mass of 2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)

PVAm 6:

Polymer of 10 mol% of vinylamine units and 90 mol% of N-vinylformamide units, having a molecular mass of 400,000 D (prepared by partial hydrolysis of poly-N-vinylformamide)

**PVAm 7:**

**Polymer of 10 mol% of vinylamine units and 90 mol% of N-vinylformamide units, having a molecular mass of 1.2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)**

**PVAm 8:**

**Polymer of 1 mol% of vinylamine units and 99 mol% of N-vinylformamide units, having a molecular mass of 1.2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)**

**PVAm 9:**

**Polymer of 20 mol% of vinylamine units and 80 mol% of N-vinylformamide units, having a molecular mass of 1.2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)**

**PVAm 10:**

**Polymer of 95 mol% of vinylamine units and 5 mol% of N-vinylformamide units, having a molecular mass of 800,000 D (prepared by partial hydrolysis of poly-N-vinylformamide)**

**PVAm 11:**

**Polymer of 30 mol% of vinylamine units and 70 mol% of N-vinylformamide units, having a molecular mass of 800,000 D (prepared by partial hydrolysis of poly-N-vinylformamide)**

**PVAm 12:**

**Polymer of 10 mol% of vinylamine units and 90 mol% of N-vinylformamide units, having a molecular mass of 800,000 D (prepared by partial hydrolysis of poly-N-vinylformamide)**

**PVAm 13:**

**Polymer of 30 mol% of vinylamine units and 70 mol% of N-vinylformamide units, having a molecular mass of 1.2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)**

**5. Additional Examples (2, 3, 4, 10, 11, 12)**

Paper stock is prepared from the following components: 14 wt% pine sulfate, 34 wt% of bleached birch sulfate, 21 wt% of coated broke and 31 wt% of ground calcium carbonate. The components are mixed at 4% consistency (based on dry paper stock) for 15 minutes.

After mixing the 400g/t of PVAm X (X = 3, 4, 5, 7, 8, 9) is added to the stock and the stock is again mixed for 15 minutes. After that the high consistency stock is diluted to 0.5% consistency by adding water. The diluted stock is stirred at low speed for another 2 minutes.

250 ml of the diluted stock is then filtered in a dynamic drainage jar using a screen with 80  $\mu$ m wire opening. The number and size of pitch particles in the filtrate is then counted using the BASF laser pitch counter.

6. Comparative Examples (7, 8, 9, **13, 14, 15, 16**)

Paper stock is prepared from the following components: 14 wt% pine sulfate, 34 wt% of bleached birch sulfate, 21 wt% of coated broke and 31 wt% of ground calcium carbonate. The components are mixed at 4% consistency (based on dry paper stock) for 15 minutes.

After mixing the 400g/t of PVAm X (X = 1, 2, 6, **10, 11, 12, 13**) is added to the stock and the stock is again mixed for 15 minutes. After that the high consistency stock is diluted to 0.5% consistency by adding water. The diluted stock is stirred at low speed for another 2 minutes.

250 ml of the diluted stock is then filtered in a dynamic drainage jar using a screen with 80 µm wire opening. The number and size of pitch particles in the filtrate is then counted using the BASF laser pitch counter.

7. The results of Additional Examples 2, 3, 4, **10, 11, 12** and Comparative Examples 7, 8, 9, **13, 14, 15, 16** are summarized in the following table:

	Polymer	Reduction in the number of pitch particles per volume at a particle size >15µm relative to blank [in %]
Additional Example 2	PVAm 3	89
Additional Example 3	PVAm 4	85
Additional Example 4	PVAm 5	83
<b>Additional Example 10</b>	<b>PVAm 7</b>	<b>81</b>
<b>Additional Example 11</b>	<b>PVAm 8</b>	<b>77</b>
<b>Additional Example 12</b>	<b>PVAm 9</b>	<b>74</b>
Comparative Example 7	PVAm 1	39
Comparative Example 8	PVAm 2	31

Comparative Example 9	PVAm 6	42
<b>Comparative Example 13</b>	<b>PVAm 10</b>	<b>55</b>
<b>Comparative Example 14</b>	<b>PVAm 11</b>	<b>57</b>
<b>Comparative Example 15</b>	<b>PVAm 12</b>	<b>47</b>
<b>Comparative Example 16</b>	<b>PVAm 13</b>	<b>61</b>

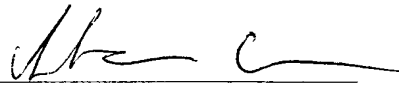
8. An acceptable result with stock treatment is achieved when the total number of pitch particles at a size above 15  $\mu\text{m}$  has been reduced by more than 70% relative to the blank. This corresponds to the situation of the amount and size distribution of white pitch measured in the white water of the paper machine case in Example 1 of the above-identified application.

9. The above-discussed data demonstrate that polymers which comprise vinylamine units and which have (1) an average molar mass  $M_w$  of at least 1 million and (2) a degree of hydrolysis of from 1 to 20 mol%, provide superior results with regard to reduction of pitch particles when added to a high-consistency stock (A) compared to corresponding polymers having an average molar mass  $M_w$  of less than 1 million and the same degree of hydrolysis, and (B) compared to corresponding polymers having a degree of hydrolysis of greater than 20 mol% and the same average molar mass  $M_w$ .

10. The above-discussed results are unexpected because the applied prior art does not appreciate the significance of the combination of above features (1) and (2) with regard to reduction of pitch particles when added to a high-consistency stock. One of ordinary skill in the art would have expected similar results, for example, for an average molar mass  $M_w$  of at least 1 million, such as 1.2 million, and a degree of hydrolysis greater than 20 mol%, such as 30 mol%, or for an average molar mass  $M_w$  of less than 1 million, such as 800,000 and a degree of hydrolysis of from 1 to 20 mol%.

11. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

12. Further declarant saith not.

  
\_\_\_\_\_  
Signature

12. 1. 2012  
\_\_\_\_\_  
Date